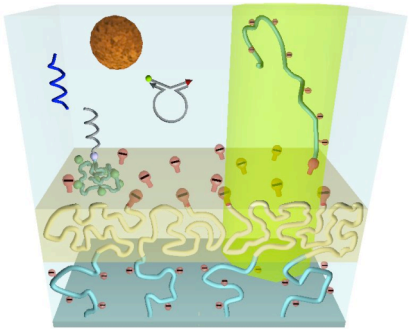
Seminar



Date: Monday, Nov 22, 2004
Time: 11:00 AM
Location: Technology Building 225/A365

LIGHT-REGULATED CAPTURE OF BIOMOLECULES MEDIATED BY PHOTORESPONSIVE POLYELECTROLYTES

Speaker: Jason Benkoski, Chalmers University of Technology

Phospholipid vesicles and supported bilayers have emerged as a promising platform for the development of biorecognition devices. To expand the capabilities of such biochips, it becomes desirable to direct and control the assembly of lipid structures into more sophisticated architectures. As one step towards this goal, we demonstrate the photoregulated desorption of a new class of polymer from lipid bilayers. The neutral, hydrophobic polymer resides within the bilayer under mild pH and ambient conditions. However, it contains side groups that can undergo excited state proton transfer (ESPT). The polymer therefore behaves as a polyelectrolyte when exposed to UV light. With the ensuing increase in hydrophilicity, the molecule is spontaneously ejected from the bilayer. Quartz crystal microbalance measurements (QCM) have recorded such transient kinetics, and have shown that a rapid buffer exchange during light exposure results in efficient removal of the polymer from the system.

A one-step approach to the synthesis of the monomer, performed under relatively mild reaction conditions, made it possible to synthesize each polymer in a single step. It also made possible the functionalization of the polymer with DNA oligomers. By decorating a supported bilayer with such a polymer, one could form DNA tethers between the bilayer and single unilamellar vesicles by decorating the latter with the complementary DNA oligomer. The lateral diffusivity of such assemblies was then measured as a function of vesicle size, tether length, and anchor size. Fluorescence recovery after photobleaching measurements (FRAP) indicated that the mobility was only influenced by the size of the hydrophobic anchor.

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